

MONTANA AERONAUTICS COMMISSION



Volume 16 No. 9

September, 1965

EASTERN MONTANA COLLEGE GROUP MAKES SURVEY FLIGHTS

Thirty Nine teachers attending the summer sessions at Eastern Montana College in Billings went on survey flights during July and August in conjunction with their Geography, Geology and Conservation Courses.

The flights, made possible through the efforts of Professor Elmer Anderson and Dr. Wilson Clark in co-operation with the Lynch Flying Service, were made in Cessna 172 aircraft and financed by the individual teachers.

The group, consisting mainly of experienced practising teachers, were extremely enthusiastic about the flights, reporting them interesting and beneficial.

The Conservation Air Tour purposes were to show a number of problems from the aerial vantage point of several thousand feet in the air—to show erosion, block farming, strip cropping and irrigation systems. The flights also accented examples of "what not to do" to the land as well as examples of "what should be done" and "what has been done".

The Geography and Geology Flights gave the teachers an excellent opportunity to observe from above the drainage patterns - the land

forms - land use - transportation patterns, (highways, railways, etc.) - settlement patterns - urban development and to stimulate ideas for the betterment of all communities.

1965 AVIATION EDUCATION WORKSHOPS

Mary Jo Janey, Supervisor
Aviation Education

An over-all high degree of success was evident in the 1965 Aviation Education Teacher Workshop Program. Individual courses were held at each of the five units of the University System: Montana State College at Bozeman—directors, Dr. A. C. Brewer and James Tibbs; Montana State University at Missoula—directors, Mervin Johnson and Nell Garland; Western Montana College of Education at Dillon—directors, Dr. Wesley Caspers and Mavis Boyce; Eastern Montana College of Education at Billings—directors, Herbert C. Christiansen and Charles Lundgren and Northern Montana College of Education at Havre—director, Ronald Kologi. An additional privately sponsored course was held at College of Great Falls with the director being E. J. Whalen. A total of 132 teachers attended these six workshops.

These courses have established themselves as being not only highly

stimulating, but very practical for the teachers who take them. Those who know and love aviation can appreciate the deep interest that teachers manifest in all the activities and experiences they gain in these courses in aviation.

Particularly pleasing this year was the emphasis the workshops placed on general aviation and what it means to Montana. To strengthen this emphasis, a number of state pilots, members of various local MPA hangars, assisted in air lifting the teachers from the workshop sites to Helena and Great Falls. Hangars taking part were: Missoula, Havre, Bozeman, Billings and Dillon. Besides this help from local pilots, many of the Flight Operators were most generous with their assistance, including Hensley Flying Service, Havre; Lynch Flying Service, Billings; Missoula Skyflite and Johnson Flying Service in Missoula; Flight Line, Inc., and Gallatin Flying Service in Belgrade; Westall's Dillon Flying Service and Severson Air Activities, Great Falls.

Other agencies cooperating with resource personnel were: Civil Air Patrol; National Aeronautics and Space Administration; Federal Aviation Agency; U. S. Air Force; U. S. Navy; Montana Department of Public Instruction; National Aerospace Education Council; Mountain States Telephone and the U.S. Weather Bureau.

**Official Monthly Publication
of the
MONTANA AERONAUTICS
COMMISSION**

Box 1698

Helena, Montana

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MONTANA'S PAUL SODERLIND RECEIVES FAA'S HIGHEST HONOR

Captain Paul A. Soderlind, Director of Flight Standards for Northwest Airlines, today received the Federal Aviation Agency's highest honor—the Award for Extraordinary Service—for his outstanding research on turbulence and its effects on swept-wing jet aircraft.

Soderlind received the award from FAA Administrator William F. McKee in ceremonies at the Agency's Washington headquarters. McKee said, "All aviation owes Captain Soderlind a debt of gratitude. His contributions have materially increased the efficiency and safety of high altitude jet operation."

The citation accompanying the gold medal lauded Soderlind for providing the entire aviation industry with the most authoritative and understandable single source of information on jet turbulence penetration.

The FAA has been exploring every facet of the turbulence problem as it particularly applies to jet transports ever since the jet was introduced into commercial service in late 1958. As a result of its growing concern with the problem, the Agency undertook a series of research projects of its own and, in addition, joined industry and other government agencies as an active partner in other research programs on turbulence. Today, these programs are in varying stages of completion.

At Northwest Airlines Captain Soderlind, as an outgrowth of his

studies, developed a lecture program for pilots which thoroughly examined the limitations and capabilities of sweptwing turbojets in high altitude operations. His presentations logically explained the buffet boundary and the effects of altitude, speed and weight; speeds for turbulence penetration; stabilizer drive stall; elevator capability and elevator forces; the autopilot in turbulence; the problems of negative "G" forces; control cues and control problems; and recommended procedures for operation in turbulent air.

When first given at Northwest Airlines' Minneapolis headquarters, Captain Soderlind's presentations so impressed top FAA officials who attended them that they requested Soderlind to repeat the lectures at FAA's Oklahoma City training base for the benefit of selected Agency jet specialists. These FAA specialists then returned to their respective field stations and passed on the information to airline pilots in their regions. Soderlind himself on numerous occasions also delivered his presentations to pilots of other airlines. His work served as a guide for the development of similar programs which became an integral part of all airline pilot training and refresher courses.

Born in Billings, Montana, August 6, 1923, Soderlind began learning to fly at the age of 12. He has been with Northwest Airlines for 23 years. Today he is responsible for all technical aspects of the company's flight operations.



FEDERAL AVIATION AGENCY ITINERARY LISTING

Airport	Sept.	Oct.	Nov.	Dec.
Bozeman (Gallatin Field)	.....	.....	.....	16
Culbertson	.....	6	.....	1
Glasgow	.....	15	.....	17
Glendive	.....	20	.....	15
Great Falls (International)	9	7	4	9
Lewistown	.....	27	.....	22
Miles City (Municipal)	30	.....	24	.....
Missoula	23	21	18	22
Sidney	29	.....	10	.....

NOTE: Provisions have been made to give private pilot written examinations ON AN APPOINTMENT BASIS ONLY at the following FAA Flight Service Stations:

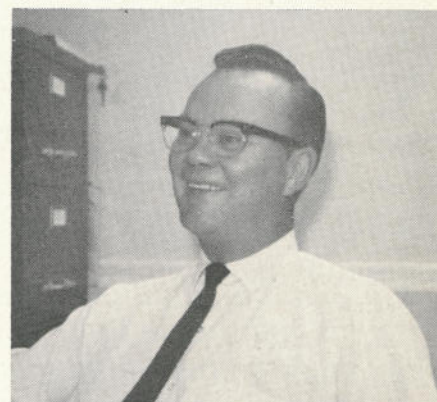
Bozeman
Butte
Cut Bank
Dillon

Lewistown
Livingston
Miles City
Missoula

R. MITCHELL, CHIEF LIVINGSTON FSS

Robert N. Mitchell has taken over the duties of Chief of the Federal Aviation Agency's Flight Service Station in Livingston.

Mr. Mitchell entered service with the CAA (FAA) in 1945—was stationed in Miles City for 10 years—transferred to Seattle, Washington in 1955. After 6 years in the Seattle Flight Service he returned to Montana and was located in Great Falls until his move to Livingston in May of this year.



Robert N. Mitchell

Mr. Mitchell was born in Grand Forks, North Dakota—attended high school in Poplar, Montana—Montana State University and Chicago Music College. Bob entered the Army Air Corps in 1942 and served as radio operator/gunner aboard B-17 and B-24 type aircraft. He holds the Silver Star, the Distinguished Flying Cross, Purple Heart and the Air Medal.

Bob and his wife, Mary Louise, have 3 sons and 1 daughter.

Bob states that he is very pleased with his new assignment and enjoys the people and the working/living conditions in Livingston.

PHONE INSTALLED ON SEELEY LAKE AIRPORT

The Blackfoot Telephone Cooperative has recently installed a pay phone on the Seeley Lake Airport. The phone is the type which you can dial the operator without the use of a dime and is located near the pedestrian gate adjacent to the parking apron. Number—677-9474.



CALENDAR

September 8, Helena—Montana Aeronautics Commission Regular meeting.

September 12, Harlowton—2nd Annual Fly-In. Free Breakfast 7:00 A.M. The event is sponsored by the Chamber of Commerce with the assistance of the Kiwanis Club, Country Club and the Flying Club. Transportation will be provided free by Harlo Motors, Ford-Mercury—Fly In and Play Golf!

September 12, Laurel—Flying Farmers and Ranchers Pot-luck picnic. All pilots welcome!

September 18 - 19, Billings—Air Fair. (See Article).

September 20, Jekyll Island, Georgia—34th Annual Meeting of National Association of State Aviation Officials.

September 23, 24 & 25, Portland, Oregon—International Northwest Aviation Council Annual Fall Meeting.

September 28 - October 3, Las Vegas, Nevada—AOPA Plantation Party and Industry Exhibit. Industry exhibits and aviation clinic sessions open to all. For entertainment accommodations "package plan" rates, information on flight training course and registration, write Plantation Party AOPA, Washington D. C. 20014.

October 1 - 3, Billings—Annual Montana Flying Farmers and Ranchers convention. Holiday Inn.

October 2, Grand Haven, Michigan—The 10th Annual Michigan Small Race conducted in cooperation with the Michigan State Dept. of Aeronautics and sponsored by the Michigan chapter of Ninety-Nines, International Organization of Licensed Women Pilots, will be held at Grand Haven Memorial Park.

October 3, Jordan, Montana—Airport Dedication, October 3. (Rain Date, October 10).

October 11 - 13, Norman, Oklahoma—The National Airports Conference to be held at University of Oklahoma. The conference is held under the joint sponsorship of the University of Oklahoma and the

American Association of Airport Executives with the active support of the FAA. Persons, in all segments of the Aviation Industry, should endeavor to participate in this national conference.

December 31—Closing date for the Annual FAA Aviation Mechanic Safety Awards Program for 1965.

MONTANA FLYING FARMERS ATTEND NEBRASKA CONVENTION

The 20th annual International Flying Farmers convention was held in Omaha, Nebraska, August 8 through 13. Montana Flying Farmers attending were: Mr. and Mrs. Milton Butcher of Winifred, Mr. and Mrs. Sam Langhus of Big Timber, Mr. and Mrs. Edwin Baldwin of Polson and Mr. and Mrs. Clay Greening of Laurel. Mrs. Greening is the present Flying Farmers Queen for the Montana chapter.

One important issue of the '65 convention was discussion on Senate Bill 1596 regarding excessive charges to private aircraft for border crossing on Sundays, Holidays and afterhours. All pilots were urged to write to their congressmen for the necessary legislation which would eliminate such charges.

COLUMBUS FLY IN CROWD ENJOYS BREAKFAST AND GYRO PLANE DEMONSTRATION

The Fly In held at Columbus on July 25 attracted 25 aircraft and breakfast was served free to the pilots and passengers by Chet Moran of the Air Bowl. The weather was good and in addition to the local persons attending there were a number from the Billings area and several flying in from as far west as Helena and as far east as Miles City.

The first Montana based gyro plane was one highlight of the day. Recently purchased by Johnston Aircraft of Billings, the copter was delivered by Gary Wolterman of Columbus. Gary attended the training school at Muncie for the Air Space Model 18A Gyro and obtained his Instructors rating for the aircraft. Darrel "Mike" Ferguson of Big Sky Maintenance, Billings, accompanied Gary to Muncie and completed the mechanics course on the gyro.

BLUE ANGELS AND F. D. PITTMAN WILL STAR AT BILLINGS AIR FAIR

The 6th Annual Billings Jaycees Air Fair to be held September 18 and 19, will feature the United States Navy's "Blue Angels" and F. Don Pittman, Aerobatic star from Sapulpa, Oklahoma.

The Blue Angels, 1965 International winners for Military Team Aerobatics competition held in Paris, France, will present 2 shows a day. Pittman will give aerobatic demonstrations in his "Pit Special" and a Piper Super Cub.

There will be Sky Diving Demonstrations and static aircraft displays of military and commercial aircraft. The displays will include the Lear Jet and Northwest's 720 C, commercial passenger and cargo full jet aircraft.

President of the Billings Jaycees, Dr. Jim Hurry and Air Fair Chairman, Jack Sleight report that Billings the week-end of the 18th will also be the scene of the South Dakota/University of Montana Football Game and the Formal Base Dedication and Open House for the Air Defense Facility of the 29th Fighter Interceptor Squadron at Logan Field.

Fly in for the week-end—DON'T MISS IT—BE IN BILLINGS—SEPTEMBER 18 & 19!!

COMMERCE/FAA ANNOUNCE JOINT PUBLICATION OF NEW WEATHER MANUAL

A new weather manual for pilots, AVIATION WEATHER was published jointly today by the Federal Aviation Agency and the U.S. Weather Bureau, Department of Commerce.

The colorfully-illustrated 300 page book provides weather fundamentals and how to use the aviation services of the Weather Bureau.

The publication is offered pilots with the following word of caution: "Pilots should understand the limitations as well as the capabilities of present day meteorology; otherwise, the impossible may be requested, while the attainable may be overlooked. It is almost as bad for the pilot to have complete faith in weather forecasts as it is for him to have none at all. Pilots who understand both the information given and limitations of weather observations

and forecasts usually are the ones who make the most effective use of the weather service. The weather-wise pilot looks upon a forecast as professional advice rather than the absolute truth. . ."

The weather manual is divided into 22 chapters on The Earth's Atmosphere, Temperature, Atmospheric Pressure, Wind, Moisture, Stability, Turbulence, Clouds, Air Masses, Fronts, Thunderstorms, Icing, Common "IFR" Products, the Nation's Aviation Weather System, Weather Observations, Weather Charts, Aviation Weather Forecasts, Using and Helping the Weather Service, High Altitude Weather, Arctic Weather, Tropical Weather, and Soaring Weather.

Availability of the book is not expected to lessen demand for personalized weather service between pilots and weathermen, which will continue as it has in the past.

The new edition supersedes and replaces the basic weather manual for pilots issued in 1954 as the "Pilot's Weather Handbook, CAA Technical Manual No. 104". It may be purchased for \$2.25 from the U.S. Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.



FILM LIBRARY REPORT

During the past year the Commission's film library has been loaned to schools, aviation organizations and interested persons 576 times—a 20% increase over 1964—a 150% increase over 1963. A total of 39,744 persons have viewed the Commission's 48 films and 8 record/film strips.

The film "Montana and the Sky" is still the most popular film in the library and was shown in 25 different states and Sweden with a total of 4,050 out-of-state viewers.

The appreciation shown by our film users is rewarding proof that the maintaining of our film library is a needed and worthwhile project.

Following are excerpts from a few of the many letters received by our film department.

. . . . We had the pleasure of seeing the film on Montana made by the Montana Aeronautics Commission.

We enjoyed very much the performance of this in all respects wonderful film. On behalf of the club members the President asked me to convey to you our thanks for your kindness to lend us this film. . . .

Ake Side'n
(International Service)
Sandviken Rotary Club
Sandviken, Sweden

. . . . Our group of twelve students received considerable benefit from the recording Theory of Flight and the two films To Save A Life and Flight Decision. We certainly wish to take full advantage of all of the aids available during the next several weeks. . . .

Robert W. Cook
Skycraft
Lewistown, Montana

. . . . I am returning to you the records which we borrowed from you several weeks back with my sincere thanks. They were very helpful to us.

David Ditzel
C/Commander
Libby Composite
Squadron
Civil Air Patrol
Libby, Montana

. . . . Thank you for the opportunity of borrowing this excellent film (Montana and the Sky).

G. Cuthbertson
Supervisor of Education
United States
Penitentiary
Leavenworth, Kansas

. . . . I would like to take this opportunity to thank you for the films which we have obtained from you. The pupils have enjoyed them tremendously, and I have found them a real aid in teaching.

Margaret Workman,
Teacher
Erickson School
Conrad, Montana

. . . . This year we are working in conjunction with Mr. Crossman, Science Instructor at Whittier Elementary School, using your films on Montana Aeronautics. Thank you for providing this service to schools, it is indeed a great aid to education. . . .

Sister Mary Leon,
Principal
Saint Mary's School
Butte, Montana

FOR SALE: Aeronca Sprayer. 108 Lycoming—Belly tank—Metalized—Tank truck and trailer. Price: \$2,500 takes everything. Contact: Morrison Flying Service, Helena. Phone: 442-2190.

SUCCESSFUL FLY-IN & FISH DERBY HELD AT LIVINGSTON

The Livingston Hangar of the Montana Pilots Association's Fly-In Barbeque in conjunction with the Fish Derby held on August 7 and 8, attracted 250 people. 13 aircraft arrived with 50 participants—the remainder of the crowd were local.

Even though the prize winning fish was caught by a non-flyer—a real fun time was had by all!!

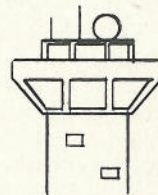


Mr. and Mrs. John M. Mamuzich shown enjoying the barbeque. The Mamuzichs are owner of Pondera Flying Service of Conrad.

STATISTICS

61/37
43/17
43/17

	Accidents Total	Fatalities
1964 Total	61	37
'64 as of this date ..	43	17
'65 as of this date ..	43	17

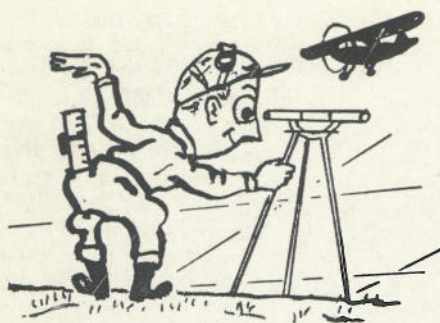


TOWER

OPERATIONS

MONTANA TOWER CONTROLLED AIRPORT OPERATIONS

	July, 1965 Total Operations	Instrument Operations
Great Falls	12,977	652
Billings	11,143	742
Missoula	7,596	167
Helena	4,829	59



EUREKA. The volunteer labor and equipment project at Eureka has been completed—the 300 foot extension to the north/south runway and an emergency crosswind runway. The engineering department of the Montana Aeronautics Commission surveyed and staked the north/south runway for the installation of the low intensity lighting system which will be installed this fall.

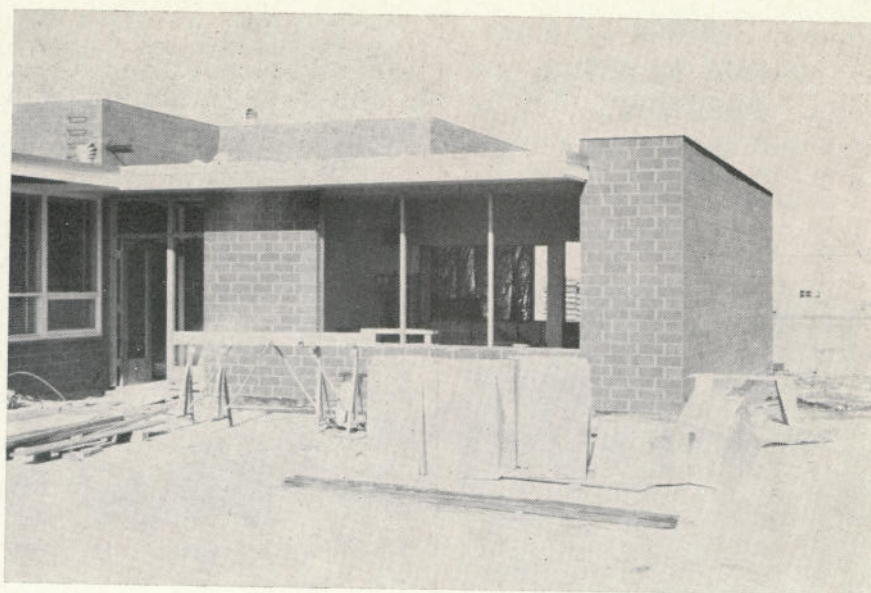
LINCOLN. The paving project on the Lincoln airport is nearing completion and will be open to use in early September.



Lincoln Airport with paving underway.

WOLF POINT. The preliminary engineering has been completed on the Wolf Point airport improvements. The engineering report indicates that the runway must be lengthened from the existing 4,000 feet to 5,100 feet to accommodate the Convair 580 that will soon be used by Frontier Airlines.

AIRMARKING. 98 airmarkers were painted this summer by the Montana Aeronautics Commission airmarking crew, including: Updating markers to identify new airports; establishing new markers where the original had been destroyed; and repainting existing markers that were weathered to the point of becoming illegible.



MAC office addition under construction.



Garage Unit near completion

MAC OFFICE ADDITION AND GARAGE UNIT. Work is approximately 60% completed on the construction of the Montana Aeronautics Commission office addition and garage unit. When completed the office extension will house the engineering department and provide a conference room. The garage unit will provide two heated auto parking spaces as well as four unheated stalls.

MAINTENANCE. Montana Aeronautics Commission maintenance crews placed pilot registration desks on 48 airports this summer.

Your cooperation in registering

your arrival to and from these airports will be appreciated.

WEST YELLOWSTONE REPORT as of July 31, 1965

Scheduled Services	Month	Year to date
Passengers (on and off)	3,099	4,339
Mail	978 lbs.	1,321 lbs.
Express	148 lbs.	178 lbs.
Airfreight	2,571 lbs.	3,460 lbs.

AIRCRAFT TRAFFIC MOVEMENTS

Scheduled Airlines	186	290
Private Aircraft	802	1,590
Military Aircraft	2	20

FOR SALE: Aeronca 7 AC—200 SMOH—Recent fabric, Linen and ceconite—New Prop—Tinted Glass—Sensitive Altimeter—Turn and Bank—Aux. tanks, 23 gal. total. Goodyear wheels—Disc brakes—Fresh license. Call or write: John Stevens, Box 308, Twin Bridges, Montana. Phone: 684-5666, evenings.

FRANK HUNTER ELECTED HELENA HANGAR PRESIDENT

At a picnic dinner held on August 5 at the Country Club—the Helena Hangar of the Montana Pilot's Association elected Frank H. Hunter President for the coming year.



Frank H. Hunter

March E. Hopkins was elected Vice-President and Helen Dunlop, Secretary-Treasurer. Approximately 40 members and wives attended the evening festivities and a really fine time was had by all.

A CASE IN POINT

by Charles A. Smith
Commission Attorney
**"AIRCRAFT COLLISION—
NEGLIGENCE"**

In a recent State Court decision, the plaintiff received a jury verdict in the amount of \$32,500 for damages sustained as a result of an aircraft collision.

Plaintiff, student pilot, who was making an approach to a runway for a landing, collided with defendant's plane which had made a touch and go landing with a student pilot. At the trial, both parties contended each should have seen the approaching aircraft and thereby avoided the accident.

The plaintiff was flying for the third time solo. The defendant aircraft was in the process of a touch and go landing (an instructor and student), having approached the airport in a traffic pattern for the runway extending from southwest to

northeast. The final approach was made from southwest towards the northeast.

The plaintiff student pilot flew the traffic pattern for a 2,000 foot runway which runs east to west. His final approach was from west to east.

The flight procedure at this airport briefly stated is as follows:

"In pursuing a traffic pattern approach to the airport, the pilot enters the pattern on what is referred to as the 'down wind leg' which is parallel and 2,000 feet to the right of the runway upon which he expects to land. The planes in this case were at an altitude of 600 to 800 feet at this point. Upon entering the down wind leg the pilot continues in a straight course parallel to the runway to a point 1,000 feet beyond the end of the runway. At that point he will have descended to an altitude of not less than 400 feet; and he then makes a 90° turn to the left, called the 'base leg', traveling the 2,000 feet to a point approximating the end of the runway he is approaching, and descending all the while to a minimum altitude of 200 feet. At the end of the base leg, he makes another 90° turn to the left and begins his final approach to the runway which should be approximately 1,000 feet dead ahead."

The defendant was making a touch and go landing at the time of the accident. In a touch and go landing the pilot of the aircraft brings it down on to the runway in the above described manner, rolls along the runway without coming to a stop, and then proceeds into the air again. In the instance case the defendant landed on the runway in a northeasterly direction. The defendant aircraft touched down on the runway at a point in the first third of the runway, rolled for a distance of 50 to 75 feet at 35 to 40 mph and, upon reapplying power, became airborne again, proceeding to a point at which defendant observed the aircraft operated by the plaintiff descending from his left and approximately 100 feet away. At that point, both aircraft were 25 to 50 feet above the ground. Defendant immediately took control of the plane and made a hard right turn to avoid a collision. He felt an impact against the plane but was able to land his plane in a normal manner.

The plaintiff was landing headed east on the runway which runs east-

west. Plaintiff testified that after flying over some trees he saw an aircraft near the end of the runway which was being used by the defendant. Plaintiff proceeded on toward and above his runway to the intersection with defendant's runway, when he saw an aircraft "just to my right". He was unable to estimate the distance of this other aircraft or state whether it was above or below him. After the collision, plaintiff's aircraft nosed over and crashed injuring Plaintiff severely.

During the trial both parties maintained that the other should have seen the other's approaching aircraft and thereby avoided the accident. The trial court concluded that the defendant should have seen the plaintiff in his "perilous position" and thus should have avoided the accident.

NATIONALITY AND REGISTRATION MARKS FOR FIXED-WING AIRCRAFT

FEDERAL AVIATION AGENCY'S ADVISORY CIRCULAR: AC 45-1

1. **Purpose.** This circular is to remind owners and operators of fixed-wing aircraft of the approaching deadline to comply with the Federal Aviation Regulations requiring the display of the subject marks on the vertical tail surfaces or on the sides of the fuselage.

2. **Reference.** Federal Aviation Regulations Part 45, Sections 45.25 and 45.29.

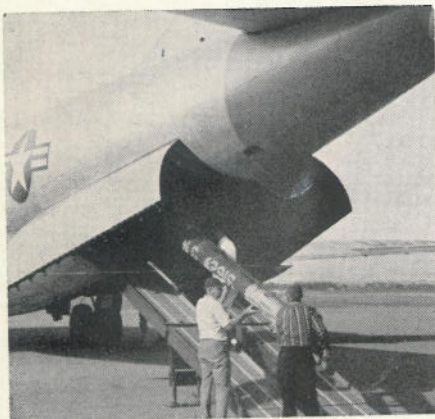
3. **Advice.** Under the provisions of FAR 45.25 and FAR 45.29, all United States registered fixed-wing aircraft, except as specifically otherwise provided in Part 45, **must display nationality and registration marks at least 12 inches high**, either on the vertical tail surfaces or on the sides of the fuselage. Other requirements pertinent to such marks must also be met. In order to preclude inadvertent violation of the regulations, operators of fixed-wing aircraft which have not been marked in compliance with these requirements are cautioned to do so prior to the January 1, 1966 deadline specified in FAR 45.25 (b). At the discretion of the owner or operator, aircraft displaying the previously required wing marks may continue to display such marks in addition to the required tail or fuselage marks.



Shown is the C97 Cargo plane from the Utah Air National Guard as it arrived in Helena to transfer helicopters.

MONTANA NATIONAL GUARD COMPLETES HELICOPTER EXCHANGE

The 163rd Aviation Company of the Montana Army National Guard with headquarters in Helena recently completed the change over from Hiller OH 23 B Helicopters and are receiving a total of six Bell OH13 E Helicopters. The Bell's being 200 pounds lighter, have proved to give a more satisfactory performance for our altitude and the Hillers are being sent to bases located at near sea level altitudes.



The loading operation attracted a crowd on the airport as the large C97 "swallowed up" the 'copters.

FOR SALE—1 Air Cooler for Cessna 180.—Complete set of 6:00 x 6 wheels—Brakes assembly discs and blocks—Goodyear 2-5:00 x 5 main wheels, 10 ply tires and tubes—1 set silver aluminum wheel pants for Cessna aircraft—1 1" inlet-3/4" outlet Simplex pump. Contact: Shorty Stott, 1215 10th Avenue, S. W., Great Falls. Phone: 453-8343.



CERTIFICATES ISSUED RECENTLY TO MONTANA FLYERS

Musgrove, Gilbert Eugene, Missoula—Instr. added to Com. ASMEL, Ford 5, F7F, B-25, B-26
 Melvin, Michael J., Missoula—Student
 Dyck, Les R., Kalispell—Student
 Bradley, Paul B., Livingston—Student
 Brandt, Jared C., Glasgow—Flight Instr.—Airplanes
 Athearn, Stephen Franklin, Helmville—Student
 Martin, Ronald, J., Missoula—Private
 Hansen, Arthur Lloyd, Missoula—Com.
 Strang, Gerald Everett, Great Falls—Student
 McDaniel, William Frederick, Tonasket, Wash.—Flt. Instr.
 Higgins, Ted Russell, Helena—Flt. Instructor—Airplanes
 Poletto, Danny A., Great Falls—Private
 Hoffman, Wayne D., Helena—Student
 Ashcraft, Larry C., Helena—Inst. Grd. Instr.—FI-A on C-IR

Reed, Robert, Missoula—Student
 Van Manen, Donald, Plains—Com.
 Buckley, Michael G., Yakima, Wn.—FI-A on C-IR
 Garrity, Leo, Great Falls—IR on C
 Hoffman, Wayne D., Helena—Student
 Mallick, Richard K., Missoula—Student
 Stewart, Elmer Lewis, Great Falls—Student
 Stimson, Thos. N. Jr., Helena—Student
 Lyman, Lee C., Missoula—Student
 Hoffman, Verne Dudley, Fort Smith, Canada—Student
 Petersen, Gerald L., Superior—Student
 Petersen, Dee D., Superior—Student
 Brandt, Darrell G., Great Falls—Student
 Kiesling, Victor J. Jr., Helena—Student
 MacNiven, Donald B., Valier—Student
 Bonner, Thomas J., Helena—Student
 Dietz, John T., Bozeman—Student
 Rieke, Tex Elvin, Wolf Creek—Private
 Ribi, Karin Smith, Hamilton—Comm
 Boyd, Charles W., Shelby—Student
 Leslie, Warren H., Missoula—Student
 Lampert, Wm. F., Missoula—Student
 Libbey, Christopher D., Livingston—Student
 Palmer, Bruce, Palo Alto, Calif.—Student
 Collins, John Marvin, Livingston—Private
 Nelson, Larry D., Missoula—Master Parachute Rigger
 Davis, Jeffrey R., Missoula—Master Parachute Rigger
 Koch, Lavanne H., Helena—Private
 McKamey, James L., Great Falls—Private
 McGuire, Vicki Jo, Livingston—Student
 Litzinger, Mathias J., Great Falls—Mech. Powerplant
 Schmidt, Gotthilf, Great Falls—Mech. Powerplant
 Haselhurst, Wm. H., Great Falls—Mech. Powerplant
 Marsh, James E., Missoula—Student
 Eason, James H., Missoula—Student
 Gibbons, Walter J., Eureka—Student
 Delaney, Donald L., Missoula—Student
 Swainson, Herbert, Livingston—MEL on Comm.
 Hallesy, Robert E., Plentywood—Private
 Becker, Mark, Burnsville, Minn.—Student

(Continued on Page 11, Column 2)

**FEDERAL AVIATION
AGENCY VFR
EXAM-O-GRAM NO. 28
FACTORS AFFECTING
STALL SPEED**

A recent report indicates that approximately 80% of all accidents are pilot caused. The major cause of fatal accidents is listed as "failed to maintain airspeed (or flying speed) resulting in a stall." Although many of these stalls may have occurred under the stress and duress of other problems such as disorientation during limited visibility or at night, improper division of attention, etc., a review of statistical analyses of written examinations indicates a lack of knowledge and understanding of the various factors that can cause or contribute to a stall. This Exam-O-Gram discusses some of the more important, ever-present factors of which the pilot must have an understanding so that he will instinctively avoid or compensate for situations, conditions, and attitudes which may lead to a stall—even under the stress and duress of additional problems he may encounter in flight.

WHAT CAUSES AN AIRPLANE TO STALL? All stalls are caused by exceeding the critical angle of attack. Knowing this particular fact does not necessarily help the pilot. What is more important to the pilot is to know what factors are likely to contribute to or cause this angle of attack to be exceeded.

IS IT NECESSARY FOR THE AIRPLANE TO HAVE A RELATIVELY LOW AIRSPEED IN ORDER FOR IT TO STALL? No! An airplane can be stalled at any airspeed. All that is necessary is to exceed the critical angle of attack. This can be done at any airspeed if the pilot applies abrupt or excessive back pressure on the elevator control. A stall that occurs at a relatively high speed is referred to as an accelerated or high speed stall.

IS IT NECESSARY FOR THE AIRPLANE TO HAVE A RELATIVELY HIGH PITCH ATTITUDE IN ORDER FOR IT TO STALL? No! An airplane can be stalled in any attitude. Repeating again the statement made above—all that is necessary is to exceed the critical angle of attack. This can occur at any attitude by application of abrupt or excessive back pressure on the elevator control.

DOES WEIGHT AFFECT THE STALLING SPEED? Yes! As the weight of the airplane is increased, the stall speed increases. Due to the greater weight, a higher angle of attack must be maintained to produce the additional lift to support the additional weight in flight. Therefore, the critical angle of attack will be reached at a higher airspeed when loaded to maximum gross weight than when flying solo with no baggage.

DOES THE CENTER-OF-GRAVITY LOCATION (WEIGHT DISTRIBUTION) AFFECT STALL SPEED? Yes! The farther forward the center of gravity, the higher the stalling speed. The farther aft the center of gravity, the lower the stalling speed.

DOES THIS MEAN THAT THE WEIGHT SHOULD BE DISTRIBUTED IN THE AIRPLANE SO THAT THE CG IS AS FAR TO THE REAR AS POSSIBLE? NO! This may present problems with stability that will far outweigh any advantages obtained by the decrease in stall speed.

DO FLAPS AFFECT STALLING SPEED? Yes! The use of flaps reduces stalling speed. The Stall Speed Chart (Figure A) excerpted from an airplane flight manual illustrates this fact. This also can be readily verified by checking the color coding on any airspeed indicator. The lower airspeed limit of the white arc (power-off stalling speed with gear and flaps in the landing configuration) is less than the lower airspeed limit of the green arc (power-off stalling speed in the clean configuration). This fact is important to the pilot in that when making no-flap landings, a higher indicated airspeed should be maintained than when landing with flaps. The manufacturers' recommendations should be adhered to as to approach speeds with various configurations.

DOES AN ACCUMULATION OF FROST, SNOW, OR ICE ON THE WINGS AFFECT STALLING SPEED? Yes! Even a light accumulation of frost, snow, or ice on the wings can cause a significant increase in stalling speed. It can increase it so much that the airplane is unable to take off. The accumulation disrupts the smooth flow of air over the wing thus decreasing the lift it produces. To make up for the lost lift, a higher angle of attack must be used or a higher speed must be attained on the takeoff roll. The runway may not be long enough to attain the necessary speed and even though the airplane

may become airborne, it could be so close to the stall speed that it would not be possible to maintain flight once the airplane climbs above the comparatively shallow zone where ground effect prevails. **DO NOT TAKE OFF UNTIL ALL FROST, SNOW, OR ICE HAS MELTED OR BEEN REMOVED FROM THE AIRPLANE.**

DOES AN INCREASE IN ALTITUDE AFFECT THE INDICATED AIRSPEED AT WHICH AN AIRPLANE STALLS? An increase in altitude has no effect on the indicated airspeed at which an airplane stalls at altitudes normally used by general aviation aircraft. That is, for all practical purposes, the indicated stalling speed remains the same regardless of altitude in this range. This fact is important to the pilot in that the same indicated airspeed should be maintained during the landing approach regardless of the elevation or the density altitude at the airport of landing. (Follow the manufacturer's recommendations in this regard.) If higher than normal approach airspeed is used, a longer landing distance will be required.

DOES AN INCREASE IN ALTITUDE AFFECT THE TRUE AIRSPEED AT WHICH AN AIRPLANE STALLS? Since true airspeed normally increases as altitude increases (for a given indicated airspeed), then true airspeed at which an airplane stalls generally increases with an increase in altitude. Under non-standard conditions (temperature warmer than standard) there is an additional increase in true airspeed above the indicated airspeed.

OF WHAT SIGNIFICANCE IS THIS TO THE PILOT? It is significant in that when landing at higher elevations or under higher density altitudes, he is operating at higher true airspeeds (and therefore higher groundspeeds) throughout the approach, touchdown, and landing roll. This results in a greater distance to clear obstacles during the approach, a longer ground roll, and consequently, the need for a longer runway. If, in addition, the pilot is operating under this misconception that a higher than normal indicated airspeed should be used under these conditions, the situation is further compounded due to the additional increase in groundspeed.

DOES TURBULENCE AFFECT STALLING SPEED? Yes! Turbulence can cause a large increase in stalling speed. Encountering an upward ver-

tical gust causes an abrupt change in relative wind. This results in an equally abrupt increase in angle of attack which could result in a stall. This fact is important to the pilot in that when making an approach under turbulent conditions, a higher than normal approach speed should be maintained. Also, in moderate or greater turbulence, an airplane should not be flown above maneuvering speed. At the same time, it should not be flown too far below maneuvering speed since a sudden severe vertical gust may cause the airplane to stall due to the higher

STALL SPEED, POWER OFF				
Gross Weight 3000 lbs.				
	ANGLE OF BANK			
CONFIGURATION	0°	20°	40°	60°
GEAR & FLAPS UP	85	87	74	92
GEAR DOWN, FLAPS 20°	81	83	70	86
GEAR DOWN, FLAPS 40°	80	82	68	85

(Note: TIAS identical with CAS)

FIG. A

STALL SPEED CHART

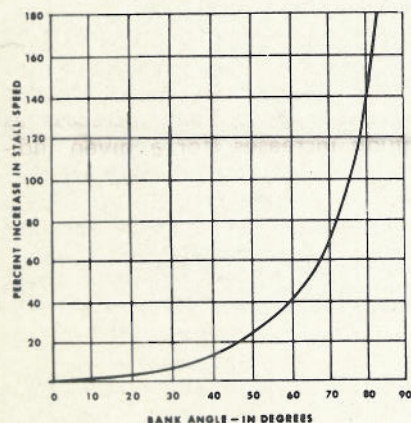


FIG. B

LOAD FACTOR CHART

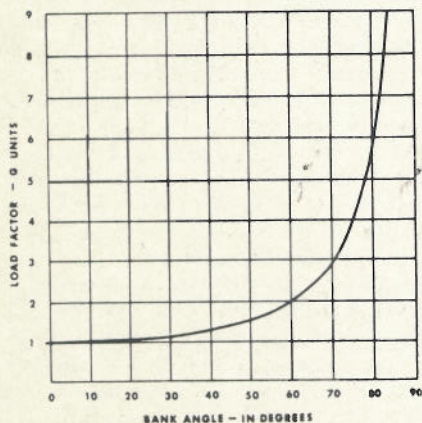


FIG. C

angle of attack at which it will already be flying.

DOES ANGLE OF BANK AFFECT STALLING SPEED? Yes! As the angle of bank increases in a constant altitude turn, the stalling speed increases. This is easily seen from the STALL SPEED CHARTS (Fig. A&B) which show the increase in stall speed as the angle of bank increases—Fig. B in terms of percent, Fig. A the actual values for one airplane. At a 60° bank stalling speed is 40% greater than in straight-and-level flight (25-27 mph for the specific example.) At angles of bank above 60°, stall speed increases very rapidly, and at approximately 75° it is doubled with respect to straight-and-level stall speed (Fig. B).

DOES LOAD FACTOR AFFECT STALLING SPEED? Yes! As the load factor increases, stalling speed increases. When the load factor is high, stalling speed is high. A comparison of the two charts (Figs. B & C) should easily show this relationship. Load factor is the ratio of the effective weight of an airplane and its contents to its actual weight. At a load factor of 2, the airplane weighs twice its normal weight; at a load factor of 4, it weighs 4 times its normal weight. Normal category airplanes with a maximum gross weight of less than 4,000 pounds are required to have a minimum limit load factor of 3.8. (The limit load factor is that load factor an airplane can sustain without taking a permanent set in the structure.) Note from the load factor chart (Fig. C) that this minimum limit load factor is attained in a constant altitude turn at a bank of approximately 75°. Also note from the Stall Speed Chart (Fig. B) that at this angle of bank, the stall speed is twice as great as in straight-and-level flight. There are two reasons then why excessively steep banks should be avoided—an airplane will stall at a much higher airspeed and the limit load factor can be exceeded. The danger is compounded when the nose gets down in a steep turn if the pilot attempts to raise it to the level flight attitude without shallowing the bank since the load factor will be increased even more. This is the situation as it generally exists when, due to disorientation, the pilot enters a diving spiral (often referred to as the "graveyard spiral") and attempts

to recover with elevator pressure alone.

WHAT FACTORS CAUSE AN INCREASE IN LOAD FACTOR? Any maneuvering of the airplane that produces an increase in centrifugal force will cause an increase in load factor. Turning the airplane or pulling out of a dive are examples of maneuvering that will increase the centrifugal force and thus produce an increase in load factor. When you have a combination of turning and pulling out of a dive, such as recovering from a diving spiral, you are, in effect, placing yourself in double jeopardy. This is why you must avoid highspeed diving spirals or if you accidentally get into one—be careful how you recover. Turbulence can also produce large load factors. This is why an airplane should be slowed to maneuvering speed or below when encountering moderate or greater turbulence.

CAN THE PILOT RECOGNIZE WHEN THERE IS AN INCREASE IN LOAD FACTOR? Yes! He can recognize it by the feeling of increased body weight or the feeling that he is being forced down into the seat—the greater the load factor the greater this feeling of increased weight or of being forced down in the seat. It is the same feeling one has when riding the roller coaster at the bottom of a dip or going around a banked curve. This feeling of increased body weight is important to the pilot because it should, if it becomes excessive, have the immediate effect of a red flag being waved in his face to warn him that the airplane will now stall at a higher airspeed or that the limit load factor can be exceeded, resulting in structural failure.

DOES SPEED AFFECT LOAD FACTOR? Speed does not, in itself, affect load factor. However, it has a pronounced effect on how much of an increase in load factor can be produced by strong vertical gusts, or by the pilot through abrupt or excessive application of back pressure on the elevator control. This is why airspeed should be reduced to maneuvering speed or below if moderate or greater turbulence is encountered. At maneuvering speed or below, the airplane is stressed to handle any vertical gust that normally will be encountered. Also, below this speed, the pilot can make abrupt full deflection of the elevator control and

not exceed the maximum load factor for which the airplane is stressed. However, it should be noted that the reason this is possible is because the airplane will stall, thus relieving the load factor. At airspeeds above maneuvering speed, abrupt full deflection of the elevator control or strong vertical gusts can cause the limit load factor to be exceeded. As airspeed continues to increase above maneuvering speed, the limit load factor can be exceeded with less and less turbulence or abrupt use of deflection of the controls.

WHAT IS THE RELATIONSHIP BETWEEN A HIGH SPEED (ACCELERATED) STALL AND LOAD FACTOR? The higher the airspeed when an airplane is stalled the greater the load factor. When an airplane stalls at a slow airspeed, the load factor will be very little more than one. When stalled at an airspeed twice as great as the normal stall speed, the limit load factor for normal category airplanes probably will be exceeded. This fact can be determined from the stall speed (Fig. B) and load factor (Fig. C) charts. Refer to the paragraph "Does Load Factor Affect Stalling Speed".

NEW LRCO FOR GLASGOW

Miles City FSS now controls a Remote Communications Site at Glasgow, Montana. Pilots should call on 122.1 MCS and receive on 122.2 MCS. Glasgow AFB VOR has no voice facilities.

This new facility should be functional for a radius of 50 miles of Glasgow. File or close your flight plan, check weather, etc., by calling **MILES CITY RADIO**.

"FAST CHARGE RBS"

The route depicted below is the route of the "Fast Charge" RBS Express Route which will be in effect from September 19, 1965 through November 13, 1965. The route shown is only the Montana route, however, the Fast Charge Express Route will cover portions of South Dakota, North Dakota and Montana.

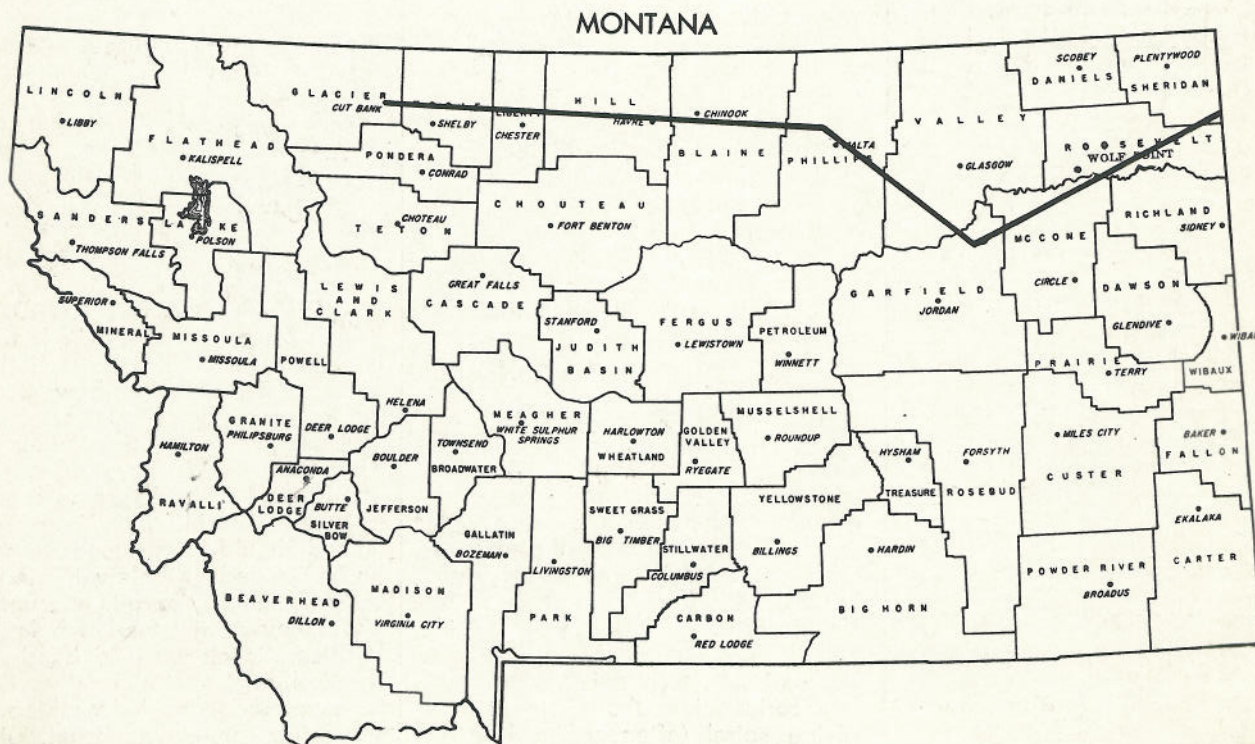
It is readily evident that this route passes over, or in near proximity to, many of the airfields in the Northern portion of the State. Listed are the airports, airport altitudes, Fast

Charge Route altitude and the height above ground level of the aircraft as they pass over or near the Montana airfields.

The rate of closure of the aircraft used on this exercise will be quite fast, so extreme caution should be exercised during the periods that these aircraft are on the Fast Charge Route.

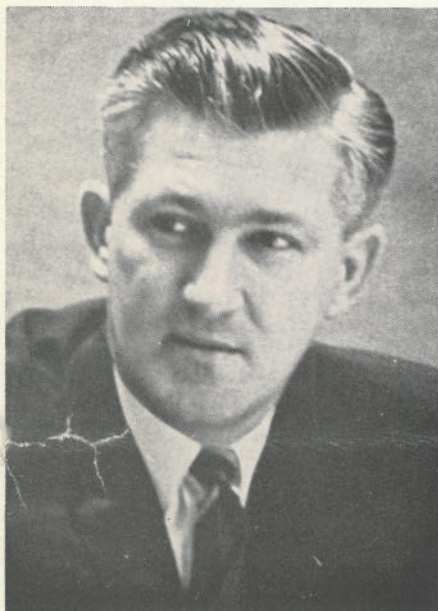
(Notices to Airmen will contain further information as to the hours that this route will be in operation.)

	Apt. Alt.	Route Alt.	Terrain Clearance
Chester	3,167	on climb	to 230
Chinook	2,410	4,500	2,090
Culbertson	1,960	4,500	2,540
Cut Bank	3,854	23,000	19,146
Ft. Peck	2,294	4,500	2,106
Glasgow	2,298	4,500	2,102
Circle	2,424	4,500	2,076
Harlem	2,560	4,500	1,940
Havre	2,589	4,500	1,911
Hinsdale	2,180	4,500	2,320
Hogeland	3,150	4,500	1,350
Jordan	2,637	4,500	1,863
Malta	2,280	4,500	2,220
Medicine Lake	1,990	4,500	2,510
Nashua	2,070	4,500	2,430
Poplar	2,006	4,500	2,494
Richey	2,494	4,500	2,006
Shelby	3,425	on climb	20,000



JEPPESEN AND COMPANY EXPANDS TOP MANAGEMENT

Announcement has been made in Denver by the Board of Directors of Jeppesen and Co., of the election of Captain E. B. Jeppesen to the position of Chairman of the Board and Chief Executive Officer, and the election of Chess F. Pizac to the position of President. Included in the Board's move to expand Jeppesen and Co., top management was the election of Wayne A. Rosenkrans, Senior Vice President to the Board of Directors.



Mr. Chess F. Pizac

Mr. Pizac, Jeppesen and Co's new president, brings to his position more than 20 years of aviation experience together with a successful background in marketing, corporate management and finance. He comes to Jeppesen and Co., from his position of Vice President-Operations at Dynallectron Corporation, Washington, D.C. Prior to that, he was Director of Marketing, Electronics and Avionics Division, Emerson Electric Co. A command pilot in the USAF during World War II, Pizac is an accomplished multi-engine pilot.

FOR SALE: 1955 PA-22-150 Super Custom—Full panel—VHF, LF—Rotating beacon—Elec. compass—Wheel pants. Excellent condition with all AD's on A/C and engine. Price: \$4,200. Contact: Morrison Flying Service, Helena. Phone 442-2190.

FOR SALE: 1946 J-3 Cub, C65 engine—Metal Spar—License to April, 1966—Turn and Bank—Sensitive Altimeter. An inexpensive timebuilder. Contact: Howard Olson, Box 848, Forsyth. Phone: 309 or 152.

CERTIFICATES

(Continued from Page 7)

Mills, Gary M., Billings—Private
Jordan, Regina M., Calgary, Alberta, Canada—Comm.
Deiss, Frederick, Powell, Wyo.—Private
Cridland, Clarence R., Miles City—Private
Bauer, Jack L., Billings—Private
Addison, Verl W., Powell, Wyo.—Comm.
Craig, Thomas W., Billings—Comm.
Mobley, Gerald E., Cody, Wyo.—Comm.
Ward, Burt L., Laurel—Private
Sheppard, Marvin H., Columbus, Ga.—Private
Steiner, Del. L., Billings—Private
Hancock, Wm. J., Billings—Student
Raver, Charles F., Cody, Wyo.—Private
Boles, Jeffrey S., Hardin—Student
Anderson, Allan S., Billings—Private
Peikert, John H., Billings—Private
Burnside, Kenneth O., Billings—Private
Wuscher, Ralph F., Seattle, Wash.—Student
Orley, Joan M., Lewistown—Private
Johnson, Richard W., Glendive—Student
Totten, Joe B., Billings—Student
Erickson, Kenneth A., Canada—Special Purpose Certificate
Moran, Chester F., Columbus—Private
Stroh, Walter L., Opheim—Student
Greenough, Wm. Jr., Bridger—Student
McCampbell, John D., Billings—Student
Clawson, Joseph P., Billings—Student
Dupay, Wm. L., Minneapolis, Minn.—Student
Moore, Ronald A., Miles City—Student
Dawson, Donald E., Kaycee, Wyo.—Student
Schendel, Dale W., Missoula—Instrument on Comm.
Nelson, Jon C., Wenatchee, Wash.—Add't rating on Comm.
Collinson, Wm. B., Glasgow—Private
Barnard, Grant, Jr., Billings—Private
Smith, Daniel K., Denver, Colo.—Private
Daniel, Arthur D., Billings—Commercial
Phares, Ivan F., Riverton, Wyo.—Private
Daniels, Jack K., Williston, N.D.—Instrument on Comm.
Buck, Thomas A., Billings—Student
Gaither, Shirley S., Great Falls—Private
Erickson, Ruth M., Helena—Student
Sullivan, Zane K., Livingston—Student
Sheridan, Daniel M., Butte—Student
Darrel, John L.—Student
Watts, Robert R., Bozeman—Student
Steffeck, James A., Helena—Student
Reber, C. Bryan, Helena—Student
Meyer, Roy D., Fairfield—Student
Christiansen, Richard G., Great Falls—Student
Karjala, Gerald Keith, Geyser—Student
Wright, Neil Ross, Missoula—Student
Brown, Stephen, Don, Missoula—Student
Fromm, Donald G., Great Falls—Private
Janey, Mary Jo, Helena—MEL Added to Com.
Peterson, Monte K., Missoula—Private
Goettle, Milford Jos., Helena—Private
Cosgrove, Jay B., Dillon—Student
Lambi, Wm. P., Kalispell—Student
Locicki, Gary P.—Student
Todd, John H. II, Great Falls—Student
Conner, Cathy R., Darby—Student
Harr, Arthur B., Missoula—Private
Stensrud, Howard C., Missoula—Private
Dean, Noble E., Kalispell—Private
Helding, Arnold G., Missoula—Student
Kane, Kenneth J., Florence—Student
Buchanan, Ken R., Rorchester, Wisc.—Student
Ribi, Edgar E., Hamilton—Student
Mueske, LeRoy E., Butte—Student
Kologi, Ronald, Great Falls—Student
Kamp, John T., Manhattan—Student
Van Manen, Donald, Plains—Flight Instructor
Adams, Chas. R., Bozeman—Flight Instructor
Posivio, Don Michael, Ethridge—Student
Swift, Gordon O., Great Falls—Student
McKee, Wm. L., Polson—Student
Ness, Stewart O., Kalispell—Student
Else, Geo. G., Hamilton—Student
Clark, Walter J., Missoula—Student
Redmond, Billy Gene, Kalispell—Private
Moon, Michael E., Missoula—Private
Kimberec, Richard C., Drummond—Comm.

JORDAN AIRPORT DEDICATION SET

October 3 will be the Dedication date of the Jordan Airport (Rain date will be October 10.)

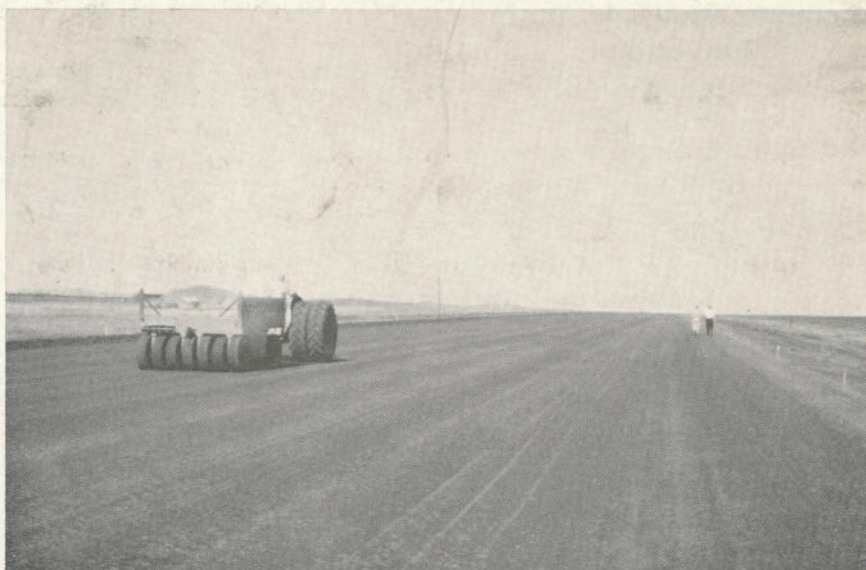
A Fly-In breakfast will be held. Watch your local news media for further details on the Dedication.

Plan to attend—October 3rd—See you in Jordan.

FOR SALE—1958 Cessna 180—0 hrs SMOH—1500 TT—Full gyro panel—VHF-LF—Omni—Tinted Windshield—Brand new rubber all around—Metco Air Tips for exceptional low speed stability. One of the best 180s you will find. Price: \$8,950. Contact: Cap Kramis, Days, 208-344-5131. Night, 208-343-1619, Boise, Idaho.

FOR SALE: 1963 Cessna Skyhawk—680 TT—Mark IV—Rot. Beacon—Heated Pitot Tube—Rear Seat Vents—Never damaged—always hanged, white with red trim. Price: \$8,000 cash. Contact: Claude E. Breese, Box 307, Poplar, Montana.

FOR SALE: 1954 PA-22—690 hrs. TT since new. 135 Lyc. engine—Full panel—Two-tone green—VHT—2 super homer and low freq. Price: \$3,000. Contact: Loren Skaw, Box 194, Dutton. Phone: 476-3447.



Jordan Airport Under Construction

MEMBER

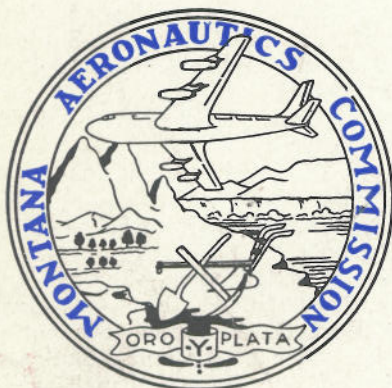
NATIONAL ASSOCIATION OF STATE AVIATION OFFICIALS

PURPOSE:—"To foster aviation as an industry, as a mode of transportation for persons and property and as an arm of the national defense; to join with the Federal Government and other groups in **research, development, and advancement of aviation**; to develop uniform laws and regulations; and to otherwise encourage co-operation and mutual aid among the several states."

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